

**Name of Work:** SBC-MYS Sec : Construction of OHT of 1.00 Lakh Litre capacity at MAD station in ADEN/MYA sub-division PID:14.01.53.25.3.50.015 -Electrical arrangements

**Definition of similar Nature of work:** Not applicable

## **CHAPTER I**

### **SPECIAL CONDITIONS OF CONTRACT FOR ELECTRICAL PORTION OF COMPOSITE TENDERS**

#### **1. Conditions covering the contract:**

The special conditions of contract contained herein shall supplement to the “General conditions of contract”. In the event of any conflict or inconsistency between them, the special conditions of contract contained herewith shall prevail. The technical specifications of contract as incorporated in this contract document and drawings supplied with Tender will form the basis for executing the work. If there are varying or conflicting provisions in the documents forming part of the contract, the Railway Engineer shall be the deciding authority with regard to the intentions of the provisions and his decision shall be final and binding on the contractor. If the contractor is not satisfied with the decisions of the Engineer at site in respect of the rates for the execution of items of works not included in the accepted schedule of rates of the contract, he may appeal to the Chief Electrical Engineer within 30 days of getting the decision of the Engineer, supported by the analysis of the rates claimed. The Chief Electrical Engineer's decision after hearing both the parties in the matter is final and binding on the contractor and the Railways.

i) The contractor shall take all precautionary measures in order to ensure protection of his own personnel moving about or working on the Railway premises and shall have to conform to the rules and regulations of the South Western Railway.

ii) The works must be carried out carefully in such a way that they do not hinder the railways operation except as agreed to by the Railways.

iii) The contractors' employees and workers shall not for any reason operate any appliances of Railway installations concerning the safety of train movements, but they should notify to the appropriate railway staff whenever necessary, who will then take necessary steps.

iv) The Contractor shall abide by the Indian Electricity Act and the Indian Electricity Rules as amended from time to time.

v) If at any time, the Indian Railways find the safety arrangements inadequate or insufficient, the contractor shall take immediate corrective action as directed by Railway representative at site.

vi) Necessary personal safety equipments as considered adequate by the Engineer in charge shall be kept available for the use of the persons employed at the site and maintained in a condition suitable for immediate use and the contractor should take adequate steps to ensure proper use of equipments by those concerned.

vii) No Electrical apparatus which is liable to be source of danger, shall remain electrically charged.

viii) Hard copies of All documents, drawings, test certificates etc. shall be submitted for the purpose of approvals, RITES inspection etc. and shall contain the seal and signature of the contractor.

#### **2. Maintenance Period:**

The contractor shall ensure satisfactory working of the installations erected by him for a period of One (01) year beginning from date of issue of completion certificates.

During this period, the contractor shall keep all materials, tools and other requisite equipment readily available and shall carryout at his own expense all modification, additions or substitutions that may be considered necessary for satisfactory working of the contracted work or equipments. Final decision in respect of unsatisfactory working of the

contract work or equipments or faulty use of designs or workmanship etc., shall rest with the Senior Divisional Electrical Engineer, South Western Railway, Bangalore and the same shall be binding on the contractor. During the aforesaid period of maintenance, the Contractor shall be liable at his own cost for all repairs or replacements of any parts that may be found defective in the contract work or equipments irrespective of whether any defect arising as a result of faulty design, materials, workmanship, installation or otherwise. Such defective parts if are not repairable at site are to be promptly removed by the contractor for repairs if so required by them and such defective parts should be replaced by them by new ones at their own expenses. In case minor repairs are carried out by the Railway at site, the cost of such repairs plus departmental charges shall be borne by the contractor.

### **3. Attending to Defects:**

The contractor shall rectify defects that may arise in the work executed, for a period of One (01) year after completion of the work, such defects being due to bad workmanship on the part of the contractor. Should any dispute arise as to the correctness of the defect pointed out, the engineer's decision in this regard is final and binding.

### **4. Time to be the Essence of the Contract:**

The contractor shall commence the works within 15 days after receipt of LOA and shall proceed with the same with due expedition without delay and shall complete the work in all respects on or before the date contracted for. The Railway attaches the utmost importance to the timely completion of the work on or before the date contracted for. In this connection, the attention of the contractor is specially invited to the clauses regarding "LIQUIDATED DAMAGES" and "DETERMINATION OF CONTRACT OWING TO DEFAULT OF CONTRACTOR" provided for in General Conditions of Contract.

The time for completing the work by the date or extended date fixed for completion shall be deemed to be of the essence of contract. If the Railway is not satisfied that the works can be completed by the contractor and in the event of the failure on the part of the contractor to complete the works within the further extension of time allowed as aforesaid, the Railway shall be entitled without prejudice to any other right, or remedy available in that behalf, to appropriate the contractor's security deposit and deal under Clause -62 of the general conditions of contract whether or not actual damage is caused by such default.

The contractor shall plan the execution of the work in such a way that it will not affect the normal working of Railways. The Railways will affect power shut down on request of contractor only during non-peak working hours.

### **5. Interpretation of the Conditions:**

With his tender the tenderer shall submit a note stating his interpretation of the specification wherever he desired to clarify and aspects of his offer. In respect of matters or issues not covered by this note it shall be assumed that the quotation confirms to the specification laid down in the tender documents. The interpretation of the Railway where such interpretation is found necessary, shall be final and binding on the contractor.

### **6. Quality Of Materials And Quality Control:**

All the materials used in the execution of the contract shall conform to the specification stipulated and shall be of the best quality and have the class most suited for the purpose specified Components, assemblies and equipments to be obtained from sub-contractors should be from proven source, chosen from the approved makes only indicated in these tender document. The work shall also conform to the following Acts, Rules and Standard Code of Practices: -

- i) Indian Factories Act.
- ii) Indian Explosive Act.
- iii) Indian Electricity Rules.

All the equipments/materials covered by this contract shall comply with the Technical Specifications enclosed of Tender Documents and relevant I.S. and B.I.S. as referred to therein in all respects and shall be adequate to perform the duties for which they are designed.

All erection work shall be of the best quality to the entire satisfaction of the Railways. The contractor shall ensure that the equipments and services under the scope of this contract, whether manufactured or performed within the contractor's premises or at his subordinate's premises or at the Railway's site or at any other place are strictly in accordance

with the provisions of this contract. For this purpose, the contractor shall adopt necessary quality assurance programme to control such activities at all stages.

## **7.**

### **a) Electrical licence:**

The works shall be carried out only by a Contractor/Person empanelled by the contractor holding a valid ELECTRICAL LICENSE issued by the any state Government for carrying out the installation work of the voltage classes involved (CLASS II/ Class B or higher class in case of this work), under the direct supervision of the persons holding valid certificates of competency for the same voltage classes issued or recognized by the State Government, for carrying out this work. An undertaking to be submitted along with the offer by the tenderer for possessing valid class electrical licence as above in his name or to empanel a person holding a valid class ELECTRICAL LICENSE for the execution of the electrical works. The successful tenderer shall furnish the names and particulars of certificates of competency of the supervisors and workmen to be engaged for carrying out this works. The electrical licence to be submitted to SSE in-charge before starting of the electrical works.

### **b) Employment of Technical Staff for the Contract Work**

In terms of provisions of new clause 26A.1 to the General conditions of contract (GCC), contractor shall also employ following Qualified Engineers during execution of the allotted work:

- (a) One Qualified Graduate Engineer when the cost of work to be executed is Rs 200 lakh and above, and
- (b) One Qualified Diploma Holder Engineer when cost of work to be executed is more than Rs 25 lakh, but less than Rs.200 lakh.
- c) Further, in case the contractor fails to employ the qualified Engineer ,as aforesaid he, in terms of clause 26A.2 to the General conditions of contract, shall be liable to pay an amount of Rs.40,000 and Rs.25,000 for each month of part thereof for the default period for the provisions , as contained in para (a) and (b) above respectively
- d) Technical staff stated above should be available at site to supervise the work and to take instruction from the Engineer-in-charge.

The period of deployment of Technical staff covers from the date issue of Letter of Acceptance till the completed works are handed over to Railways.

### **NOTE:**

- 1. Contractor should submit qualification certificates of technical staff before execution of work. SSE in-charge should verify this before execution of work.
- 2. Concerned supervisor while recording in measurement books for each CC bills should record details of Technical staff i.e. number of staff deployed with their qualification and period of deployment and same should be cross checked by test check conducting officials.

### **c) Site Order Register**

Site Order register will be maintained by the concerned supervisor properly with the dates and name of the staff taking instructions etc.

## **8. Inspection of Materials:**

For purpose of inspection of the materials by RITES/ RDSO/Railways, the contractor shall give one week notice to Sr.DEE SBC with a copy of the list of materials and quantity ready for inspection

- a. All the documents along with QAP and type test certificates necessary for inspection by RITES/RDSO shall be prepared by the successful tenderer and got signed from the competent authority.
- b. Inspection certificate granted by RITES/RDSO to be obtained by the contractor and is to be submitted to Railways for all items costing more than 5 lakhs. Payment of all charges that arise in connection with inspection by RITES/RDSO shall be borne by the contractor.
- c. The Inspection Officer(s) for the Railways shall be nominated by Sr DEE/SBC.

### **9. Facilities for Test And Examination:**

The contractor shall provide, without any extra cost, to the Railway all materials, equipments, tools, labours and maintenance of every kind with necessary testing facilities which the Railway or the Inspecting Officer may consider necessary for any test and examination to be made at the Contractor's or sub-contractor's premises and at site and shall pay all cost attended thereon.

### **10. Certificate Of Inspection And Approval:**

The Inspecting Officer or his authorised representative shall have, at all reasonable times, access to the contractor's premises and shall have power to-

- a. Certify before any equipment is submitted for inspection that it cannot be in accordance with the contract owing to unsatisfactory method employed;
- b. Reject any part of the work submitted by the contractor as not being in accordance with the contract;
- c. Reject the whole of the work including equipment tendered for inspection if, after the inspection of such portion as he may, in his discretion, think fit, he is satisfied that the same is unsatisfactory;
- d. Mark the rejected equipment with a rejection marks so that the same may be easily identified;
- e. Re-inspect at the time of erection, at site, any equipment both previously inspected and approved by the Inspecting Officer at the Contractor's or sub-contractor's premises. Notwithstanding any approval given earlier, the Contractor shall make good such rejections made, based on such re-inspection at site to the satisfaction of the Engineer.

The decision of the Inspecting Officer in regard to the acceptance or rejection of the equipment/work shall be final and is binding on the contractor.

### **11. CONSEQUENCE OF REJECTION:**

- i. On the equipment/work being rejected by the Inspecting Officer or the Railway at destination, the contractor shall replace such rejected equipment/portion of the work forthwith but, in any event, not later than a period of 4(four) weeks in the case of minor equipments and 8(eight) weeks in the case of major equipments from the date of rejection. The contractor shall bear all the cost of such replacement including freight etc., but without being entitled to any extra time on this account. The decision as to whether the equipment is to be classified as minor or major for the purpose of this clause shall be that of the Engineer and it shall not be called into question on any account.
- ii. The contractor shall, if the equipments(s)/work are rejected at the destination by the consignee be liable, in addition to his other liabilities including refund or price recoverable in respect of the equipment/work so rejected to reimburse to the Railway, the freight.

The contractor shall provide without any extra charges, all materials equipments, tools and labour of every kind for which the Rly nominee may consider necessary for any test and examinations which they shall require to be made on the contractors' premises and shall pay all costs attendant thereupon. The contractor shall also provide and deliver free of charge at such place as the Rly nominee may nominate, such materials such as they may require for the independent testing organization.

No stores will be considered ready for delivery until the inspecting officer nominated certifies in writing that they have been inspected and approved by them.

### **12. WARRANTY:**

- i. The contractor shall warrant that everything to be executed under this contract shall be new and free from all defects and faults in materials, design, workmanship and manufacture and shall be of the highest grade and consistent with the established and accepted standards for work of the type contracted for and in full conformity with technical specifications, drawings and other contract stipulations.'

- ii. This warranty shall survive inspection of, payment for, and acceptance of the work but shall One (01) year from the date of acceptance of the completed work by the Railway in respect of complaints, defects and/or claims notified to the contractor before the expiry of the warranty period.
- iii. Any approval or acceptance by the Railway at any stage of the work contracted for, shall not, in any way, limit the contractor's liability under this warranty.
- iv. The contractor's liability in respect of any complaint defect or claim shall limited to the execution, installation and erection of replacement parts free of any charges, or the repair of defective parts only to the extent that such replacement or repairs are attributable to or arise from faulty workmanship or design or material in the manufacture of the equipment/stores and/or negligence in any manner and also in the event of failure of the equipment to perform as intended.
- v. The contractor shall, if required, replace, repair, execute and/or install the goods or such portion thereof as is rejected by the Railway, the contractor shall pay to the Railway the value thereof and such other expenditure and damage as may arise by reason of the breach of the conditions herein specified.
- vi. All replacement and repairs that the Railway shall call upon the contractor to deliver or perform under this warranty shall be delivered and performed by the contractor within a period of 21 (Twenty one) days promptly from the date of receipt of advice to that effect from the Engineer. In case where such replacement, repair, execution and/or installation takes place during the warranty period, the provision of this warranty clause shall apply to that portion to replace or renew until the expiration of one (01) year from the date of such replacement, repair, execution and/or installation. This extended period shall hereinafter be referred to as "EXTENDED WARRANTY PERIOD".
- vii. If any defect were not remedied satisfactorily within the above mentioned 21 days, the Railway may proceed to do the work at the contractor's risk and cost and also without prejudice to any other rights of the Railway under this contract.
- viii. If the contractor so desire, the old parts which were replaced under warranty can be taken over by him or his representative for disposal as he deems fit within a period of 3 (Three) months from the date of replacement of goods/parts. At the expiry of this period, no claim, whatsoever shall lie on the Railway.
- ix. Moreover, the Railway may, at its discretion recover the ground rent for the goods/parts which have been rejected during the warranty period for the specified period of 3 (Three) month, if the rejected materials are not taken over within that period 3 (Three) months, by the contractor or his representative.
- x. The warranty herein contained shall not apply to any material which shall have been repaired or altered by the Railway or on its behalf in any way without the consent of the contractor so as to affect its strength, performance or reliability or to any defects to any part due to misuse, negligence or accident and to items of normal wear and tear to be specifically mentioned by the contractor in his offer and got accepted by the Railway. The decision of the Railway in regard to contractor's liability and the money if any payable, under this warranty shall be final and conclusive.
- xi. BLDC fans and LED fittings shall have on site warranty. Replacement of LED fittings and BLDC fans to be done onsite by the contractor during the warranty period.

### **13. (a) Warranty for LED light & BLDC fans fittings:**

Before submitting the final bill, the successful tenderer has to submit an INDEMNITY BOND on Stamp paper of value Rs. 200 or more, citing abidance to the 5 year warranty obligation for LED fittings & BLDC fans duly signed by the tenderer and certified by Notary against failure of entire light fitting including Driver Unit, LED Lamp etc & BLDC fans for a period of 5 years from the date of passing of Final Completion Certificate for the work. In case of failure to comply with the warranty obligation this INDEMNITY BOND will be a valid binding document for taking legal action for default.

## **14. PRICES**

Prices shall be quoted as per details shown in Schedule of Work. The prices quoted shall be firm and not subject to variations for any reasons whatsoever. The prices quoted shall be NET including all taxes and duties etc.

## **15. PAYMENT**

The contractor shall be entitled to be paid from time to time by way of “ **On Account Payment**” for such item of work carried out at station provided such works are completed in all respects to the satisfaction of the Engineer in charge of the Work.

The quantity of items required shall be jointly assessed with SSE concerned as per actual site requirement and after finalising the required quantity shall be supplied.

List of materials required and the quantity required as per actual site condition shall be jointly surveyed by the contractor and shall be submitted with the signature of executing SSE for approval before procurement.

Payment shall be made to the contractor as below.

- i. For items with separate supply and laying mentioned in schedule:
  - a. The contractor shall be entitled for 70% of payment against supply of materials of the relevant schedule item. Material Supply will be taken by the Railways in part or full as per the site conditions as per the instructions of the Engineer in-charge. Contractors are bound to adhere to the instructions of Engineer In Charge regarding the supply of materials.
  - b. 30% payment for the supplied items (against Sl.No. i (a) above) shall be paid on successful erection, testing and commissioning of the respective item, for the actual executed quantity.
  - c. In case, if any material is not erected and commissioned but supply has been taken into account, remaining 30% for supply portion shall be paid after completion of work. However, option for retaining or returning the surplus item after completion of the work shall lie with the Railways. Railway may accept or deduct the portion of payment made for such surplus quantity at its discretion. Contractor is bound to accept the decision of Railways.
  - d. In case of the schedule for laying/erection, testing and commissioning portion, 100% payment shall be paid for the actual executed quantity on successful erection testing and commissioning of the respective item to the satisfaction of the engineer in charge.

For items those combined with supply, erection and commissioning 70% payment will be made against supply of materials of the relevant schedule Item and 30% payment shall be made after the successful erection and commissioning of the relevant items of work to the satisfaction of engineer. In case, if any material is not erected and commissioned but supply has been taken into account, these materials shall be taken back by the contractor. Recoveries shall be made by railways for the portion of payment made for these items.

The bills for payment will be processed after submission of the followings.

The contractor should submit his/their bills in triplicate for payment.

The bills for payment will be processed after submission of the followings.

- a) Inspection certificate & clearance certificate granted by Railway representative as nominated by the Senior Divisional Electrical Engineer, SW Railway, Bangalore.
- b) Certificate of receipt of materials at depot/site, duly accepted by field supervisor.
- c) Inspection certificate & clearance certificate granted by RITES/RDSO for all items costing more than 5 Lakhs.
- d) Materials should be purchased from authorised dealers of the manufacturers and contractors should submit copy of invoices, indicating the contract references as a proof of purchase of materials from the authorised dealers along with the bill

**Supplied Materials** are to be accounted as per extant procedure by the SSE in-charge.

**Released materials**, if any, are to be handed over to the SSE in-charge and are to be accounted as per extant procedure. Necessary certification to this effect shall be produced from the engineer in charge along with claim for payment.

## **16. DEDUCTION OF INCOME TAX AT SOURCE:**

In terms of new section 194-C inserted by the Finance Act, 1972 in the Income tax Act, 1961 the Railway shall at the time of arranging payments to the contractor and/or subcontractor (in the case of subcontractor only when the Railway is responsible for payment of consideration to him under the contract) for carrying out any work (including supply of labour for carrying out any work) under the contract, be entitled to deduct income tax at source on income comprised in the sum of such payments. The deductions towards Income tax to be made at source from the payments, due to non-residents shall continue to be governed by section 195 of the Income tax act 1961.

## **17. RECOVERY OF TAX:**

GST, as applicable will be recovered from the running bills of the contractor. Railway will recover the prescribed percentage of GST on works contract at source from the bill value of running/final bills, which is to be remitted to the GST authorities with reference to the GST Registration Numbers in Karnataka State.

Contractor shall carry out the work as detailed in each schedule and as per the instructions of Railway representative. Acceptance of materials supplied by the contractor is subject to inspection by Railway representative.

## **18. RESPONSIBILITIES OF CONTRACTOR**

### **i. Labour laws**

**Clause 55 B to GCC: Provision of Employees Provident Fund and Miscellaneous provisions Act 1952:** The contractor with the provisions of Para 30 & 36-B of the employees provident fund scheme 1952, Para 3 & 4 of Employees Pension Scheme 1995 and Para 7 & 8 of employees deposit linked insurance scheme, 1976 as modified from the time through enactment of Employees provident fund and miscellaneous provision Act 1952, wherever applicable and shall also indemnify the Railway from and against any claims under the aforesaid act and the rules. 1. The payment to the contract labourers should be made through bank/cheque 2. Identity card should be issued to all contract workers 3. Necessary steps should be taken to ensure provident fund payment made to the contract labour and ensure that the same is credited to their provident fund account 4. Medical facilities from ESI, if applicable.

- The Tenderer/ contractor shall abide by the guidelines issued by Karnataka Labour Enforcement Office
- The employees of contractor shall not be entitled for any facility as is being provided to Railway staff. The wages are to be paid by the contractor as per the wages act/ notifications issued by government from time to time. It is the sole responsibility of contractor to observe and abide by the factory Act, Provision of Labour Act, Workman compensation Act, Provident fund Act, Minimum wages Act, Payment of wages Act, Contribution towards EPF, Gratuity Act and other regulations framed by the Govt. and revised time to time. Railway will not be responsible for any violation of the act or regulation by the contractor.
- The payment to the contract labourers should be made only through bank/cheque. Proof of payment made to contract labourers complying with minimum wages act, contributions to EPF, ESItc with supporting documents thereon should be submitted to Railways along with Bills. Contractors Bills may be withheld if the above statements are not submitted to Railways.
- It shall be the responsibility of the contractor to ensure provident fund payment made to the contract labour is credited to their provident fund account.
- Railway will not be responsible for any accident (fatal or non fatal) or injury to any personnel of the contractor or any financial implications, arising there upon.
- The contractor shall indemnify Railways from payment of any wages/damages/compensation to the labour /men employed by him.
- Persons deployed by the contractor shall have NO CLAIM to be Railway personnel in any capacity whatsoever.
- Railway administration will not take any responsibility to pay compensation towards loss of materials and personal injuries to Contractor's staff.

- The contractor shall ensure police verification of all employees employed by him for this work.

**ii. Insurance**

The contractor shall take out and keep in force a policy or policies of insurance against all liabilities of the contractor or the railway at common law or under any statute in respect of accident to persons who shall be employed by the contractor, in or about the site or the contractor's Office for the purpose of carrying out the contract works on the site. The contractor shall take about and keep in force a policy or policies of insurance against all recognized risks to their office accommodation and storage for which he is liable. Such insurance shall be in all respects be subject to the approval of the Railway.

**iii. Safety Provision of carrying out works:**

i) The contractor shall take all precautionary measures in order to ensure protection of his own personnel moving about or working on the Railway premises and shall have to conform to the rules and regulations of the South Western Railway.

ii) The works must be carried out carefully in such a way that they do not hinder the railways operation except as agreed to by the Railways.

iii) The contractors' employees and workers shall not for any reason operate any appliances of Railway installations concerning the safety of train movements, but they should notify to the appropriate railway staff whenever necessary, who will then take necessary steps.

iv) The Contractor shall abide by the Indian Electricity Act and the Indian Electricity Rules as amended from time to time.

v) If at any time, the Indian Railways find the safety arrangements inadequate or insufficient, the contractor shall take immediate corrective action as directed by Railway representative at site.

vi) Necessary personal safety equipments as considered adequate by the Engineer in charge shall be kept available for the use of the persons employed at the site and maintained in a condition suitable for immediate use and the contractor should take adequate steps to ensure proper use of equipments by those concerned.

**iv. Occupation and Use of Land**

No land belonging to or in the possession of the Railway shall be occupied by the Contractor without the permission of the Railway. The Contractor shall not use, or allow to be used the site for any purposes other than that of executing the works. Whenever non-railway bodies/persons are permitted to use railway premises with competent authority's approval, conservancy charges as applicable from time to time may be levied.

**19. RECOVERY OF CONSERVANCY CHARGES:**

As per the Railway Board's instruction, the conservancy charges to be recovered from the contractor bills as per the prescribed rates as mentioned below:

	DESCRIPTION	Average No. of labourer/Work-man employed per day.	Conservancy Cess charges to be recovered (Per Month)
	Railway contractors :		



A	Engg. Works contractors (Engg. Electrical, Mechanical, Signal, etc.,)	01 to 05 06 to 10 11 to 25	Rs. 159/- Rs. 312/- Rs. 785/-
B	General Goods handling contractors including contracts awarded by Stores deptt.	26 to 50 51 to 100 101 to 200	Rs. 1143/- Rs. 1534/- Rs. 1926/-
C	Coal handling ash pit cleaning contractors.	201 to 300 301 to 750 751 to 1500	Rs. 2318/- Rs. 2676/- Rs. 5382/-
D	Rly. Siding used by the contractors.	1501 to 3000 3001 and above	Rs. 10768/- Rs. 21508/-
E	Contractor supplying water to engines.		

**20. Compliance to statutory requirements in engagement of contract labourers by contractors of Indian Railways.**

The successful tenderer has to submit the details regarding engagement of contract labourers and the Checklist for the same is enclosed as Annexure. The same has to be submitted by the successful tenderer while submitting the PG

**21. Materials to be supplied by the Railways as per the requirement: (Approx. Qty.)**

Materials like LTUG cable, Air conditioners, Geysers etc supplied by Railways for the execution of this work has to be transported to the worksite by the contractor at their own cost. Items and approx. quantity is as follows.

4C x 95 sq.mm LTUG cable- 250 Meters

**Instructions to Contractor:**

Materials supplied by Railways should be transported to the respective work sites, in parts or full, by the contractor at their own cost. Transportation of materials includes all the machineries, tools and tackles etc., loading and unloading and man power required for the transportation of all such items. Necessary gate pass should be obtained by the contractor from the SSE in-charge for the same. The quantity and items mentioned above is tentative only. The contractor has to transport all the required materials supplied by Railways as per the site condition, for the satisfactory completion of the above work as required.

**22. Materials to be supplied by the contractor:**

Procurement of materials is to be done as per schedule in consultation with Engineer in charge of work.

**Supply of Materials by Contractors–**

Material Supply will be taken by the Railways in part or full as per the site conditions as per the instructions of the Engineer in-charge. Necessary approval for make of materials to be obtained before supply of materials from Sr.DEE/G/SBC as per the list of approved makes enclosed. Contractors are bound to adhere to the instructions of Engineer In Charge regarding the supply of materials.

The material mentioned in the schedule shall be supplied in the stores of the SSE/Ele depot as applicable subsequently it will become Railway property. The material required for work at site will be issued to the contractor by store in charge.

The transportation of material from stores to site of work will be the responsibility of contractor. The contractor will be responsible for the safety of the material at site from the date of issue of the material to till the date of commissioning of the system.

The supply of materials as per actual site requirement and the principle of JIT or “Just in time” needs to be followed to the extent possible to prevent unnecessary blockage of capital as well as to avoid blocking of space and possibility of damaged to the material due to prolonged storage.

Delivery of material should be planned in coordination with the contractor duly ensuring just in time delivery to the extent possible so that there is minimum time gap between receipt of material and its utilization for the work for which it is procured.

After receipt of the materials, it has to be taken into custody of Railways and never kept in the custody of the contractor. If there are compelling reasons to Hand over the materials to the contractor, it should be done only after taking approval of the competent authority who in turn has to ensure that financial securities of the value of the cost of the materials and indemnity bonds have been furnished by the contractor.

NOTE : Materials to be supplied by Railways if any, shall be collected by the contractor own cost duly giving a requisition letter to Engineer in Charge

### **23. LIAISON WITH EB AUTHORITIES**

The contractor shall ensure proper liaison with BESCO , LOCAL BODIES and any other authorities for obtaining all statutory approvals and to co-ordinate with BESCO /KPTCL/ LOCAL BODIES /any other authorities for timely inspections, quality control inspections. Payments for all inspection charges shall be borne by the contractor. Applications in this regard shall be prepared by the contractor and signature of Railway authorities shall be obtained. Responsibility of resolving of Right of Way (ROW) issues during execution of the work lies with the contractor.

a) Railway shall be responsible for payment of

I. Availing of new supply connection charges/deposit

II. Testing/ Supervision charges based on s estimate of ESCOM / KPTCL.

only after receiving the written advice from supply authority to obtain the sanction for commencing the work / electrical installations.

b) All the other incidental charges payable to ESCOM / KPTCL/Local authorities/ Electrical Inspectorate charges (State Govt.), charges for stamp duties/ agreements, inspection charges, statutory amount to remit for approval from local bodies etc. (other than meter charges, supervision charges/deposits) in connection with the work shall be paid by the contractor as part of the tender work. Claim for such payment shall not be entertained by Railways.

**24. Joint Procedure Order (JPO)** communicated vide HQ letter No. EL/P-General Policy part 2 (E-file 124476) Dated: 12.04.2024, attached in IREPS NIT, forms an integral part of this tender documents which involves earthwork for undertaking digging work in the vicinity of underground signalling, electrical and telecommunication cables along the Railway Track/Railway Area etc. The same has to be strictly adhered to, by the contractor while executing the works.

**25.** SSE/P/SBC is nominated for supervision, execution of electrical works and recording of measurements related to this work.

## CHAPTER II

### TECHNICAL SPECIFICATIONS & DRAWINGS

#### A. SPECIFICATIONS- GENERAL REQUIREMENTS:

- i. The work to be governed by this contract shall cover designing, manufacturing, transporting till site, safe custody at site, insurance if required, erection, and commissioning of equipments as detailed in schedule, technical specifications/ explanatory notes and in the scope of Work of tender documents. All the materials and workmanship shall strictly conform to the provision of this specification primarily and to the related Indian Standard Specification and code of practice mentioned in the specifications. All items to be supplied / provided shall conform to relevant IS/IEC standards with latest amendments and correction slips.
- ii. All the materials brought to site for use on this work shall be new of the best quality of approved makes/manufacture as per list of approved makes of equipments/materials enclosed as per Schedule and conforming to the relevant BIS specifications.
- iii. All the cable routes, locations of relevant items of work shall be first shown in drawing and marked at site and approval of the Engineer-in-charge obtained for the same before starting the work. Such drawings shall be based on the drawings issued and further based on the changes made at site by the Engineer-in-charge through instructions to the site representative of the contractor.
- iv. The rates quoted shall also include the cost of any civil works connected with the relevant items of works.
- v. All dimensions mentioned in diameter for all types of GI/MS pipes shall be Nominal Bore (NB).
- vi. The rates quoted shall also provide for handing over the necessary completion drawings together with the test results of commissioning tests carried out by the contractor, in accordance with relevant standards before the installation is handed over to the Railways.
- vii. The contractor is bound by the opinion of the Engineer-in-charge in accepting whether the work is carried out in accordance with the provisions of these specifications or not and shall take steps to rectify or replace such parts of the materials and installations as in the opinion of the Engineer-in-charge which are unsatisfactory in relation to this specifications.
- viii. All Drawings, tests and measurements, readings and documentation required for EIG approval shall be arranged and prepared by the contractor without any extra cost.
- ix. Substation shall be completed in full compliance with CPWD specification Part IV for substations and in full compliance with BESCO standard practice.
- x. All works pertaining to BESCO shall be completed as per the standard practice of BESCO and to the satisfaction of engineers in-charge of BESCO and Railways as well.
- xi. STANDARDS FOR EQUIPMENTS AND WORKMANSHIP:
  - a) The materials and equipments to be supplied and installed under this contract shall conform to the requirements of these specifications.
  - b) In further support of what is contained in this specifications, the materials and equipments as well as workmanship shall satisfy the requirements.
  - c) All the materials and equipments shall conform to the Standards not less than those stipulated under the current Indian Standard Specifications.
- xii. For such of the materials and methods of construction for which BIS have not been published, British Standards shall be followed subject to the approval of the Engineer-in-charge.
- xiii. In addition to the above, the equipment and workmanship shall satisfy the requirements of the following:-

- a) Method of construction approved by the Electrical Inspectorate.
- b) Indian Electricity Acts and Rules.
- c) Fire Insurance Regulations.
- d) I.E.E. wiring regulations.
- e) Instructions of the Engineer-in-charge based on the site conditions and revised requirements, if any.

xiv. Electrical Safety: -

- a) The work is to be done in compliance with the National Electrical Code-2011 or the latest issued by BIS.
- b) The work done to comply with the provision of CEA (Measures relating to safety and electric supply) regulation, 2010.
- c) Only items confirming relevant BIS to be used if issued by BIS in compliance of CEA (Measures relating to safety and electric supply) regulation, 2010. In case no specification is mentioned then the contractor is restricted to use the material in conformity with BIS in vogue. In such case contractor is to obtain approval of tender issue authority or Sr.DEE in advance.
- d) Contractor is advised to train/counsel or use only trained workers having the competency to work in the LV system and are aware of electrical safety.
- e) Safety shall be ensured as per provisions of National Electrical Code 2023, National Building Code 2016 (or latest), IR manual of Electrical General Service Volume-I (Power Supply)-2022(or latest), IR manual of AC Traction with all amendments, various publications of IR-CAMTECH on Electrical Safety and CEA (Measures relating to Safety and Electric Supply) Regulation, 2022 (or latest) and IE Act (As amended/superseded time to time).

## NOTES

- I. All safety precautions are to be ensured by the contractor while execution of work and no work has to be carried without the permission of Engineer in charge. Also, the execution of work should not infringe the train moving dimension as per permanent way manual nor affect the train traffic in any way. Contractor shall request for line/ power block wherever required through engineer in-charge for carrying out the works. The Railway will arrange for necessary Line/Power block for execution of the work at specified timings as per request of the contractor.

### General guidelines to ensure electrical safety. The following shall be ensured during the execution of the work.

1. All places where electrical cables/wires crossing/running parallel, touching metallic structure to be connected strongly to earthing by earthing wire of requisite cross section.
2. All passenger tickets process information displays in UTS/PRS windows mounted on MS/aluminum section grills to be attended. All such MS/Aluminum section grills to be connected to Earthing and their continuity to be checked regularly.
3. All doorbell/Call bell switches mounted on the MS Grill/or their wire crossing MS grills to be connected to earth.
4. All water pipe lines of GI/MS at offices/Houses to be connected to earthing by GI wire of requisite cross section.
5. All metallic conduits/Metallic cable trays to be connected to earthing by GI wire of requisite cross section.
6. All metallic structure through which/running parallel with electrical cables like FOB/Passengers walkway, MS/GI/Aluminum Alloy sheds also to be connected to earthing by GI wire of suitable cross section.
7. All high mast light body and its protection structures to be connected with two separate earthing by GI wire/ MS Flats of suitable cross section.
8. All DG sets/ motors/motors operating pumps to be connected with two earthing separately by GI wire of suitable cross section.
9. All lights pole on platforms and in colonies or in Railway Premises to be connected by earthing as per CEA (measure relating to safety and power supply) regulation, 2023 or latest, i.e there must be GI wire connecting each pole solidly via looping & connection always visible with three earthing electrode connection for 1 km length or part thereof.

10. All overhead wires crossing roads, premises of official houses, play grounds, public utility place to be provided with earth guard wire mesh which is rigidly connected to overhead structure which are metallic.
11. All guy wires to be provided with separating porcelain insulator after one feet from pole top connection.
12. All light poles non conducting like RCC/wood/Composite material supporting light assembly or overhead supporting structure. Such light assembly body/structure to be connected to earthing by MS flat.
13. All junction boxes of light poles to be place opposite to platform/country side making their access difficult to passengers/public and their cover to be sealed locked. The condition of junction boxes to be good without any crack/defective locking/dangling and no loose wire. They should have fuses to light assembly wire and to have connection on terminal block with way of bolt with spring washer and to lugs. No loose joints/ exposed joints not tapped by insulation to conductors be in the junction box, No bare conductor to be left in the junction box.
14. All light poles on platform colonies/ public place or junction box to be provided with Danger sign with voltage level (i.e 230 V or 440V ) with bone and skull sign on MS Plate/ Aluminum plate with caution in Hindi, English and vernacular languages.
15. Electrical control panels/meter boxes/junction box etc with only MS/Aluminum plate danger boards to be provided.
16. All motors/Generators/Panels/Transformers to be provided with danger board as details in S.N(14) above.
17. All lights poles and panels at LCs to be protected as detailed in S.N(13) and (14).
18. All motors of electrically operated LC boom to connected with two separate earthing with GI wire/MS flat rigidly as per CEA (measure relating to safety and power supply) regulation, 2023 or latest.
19. All light poles/overhead poles should be made non climbable to public as defined in CEA (measure relating to safety and power supply) regulation, 2023 or latest. Rail pole/tubular poles do come in category of non-climbable.
20. The junction boxes meter panels/electrical panels on light poles should be on height and non-accessible to children.
21. All Substations should with gate and gate to be kept under lock. The substation boundary to be such that no unauthorized person get access to substation. Danger boards to be provided on transformers, panels, control gears etc.
22. Earthing in substation to be provided as prescribed. All equipment/ panels/metallic switches bodies to be connected to individual earthings and all earthings to be interconnected.
23. All metallic fencing and gate to be inter connected and to be connected to earthing by GI wire/MS flat rigidly.
24. All metallic doors/gates and door frames/supports are to be connected with earthing and flexible shunts between them so all the time door is connected with earthing.
25. All operating handles are to be connected with flexible shunts, painted red and mounting structure to be connected to earthing. Only authorized competent staff to operate handle putting rubber gloves. All station masters and operating staff/other department staff are also to be trained to put rubber gloves capable to withstand 11/33/66 kV voltage level and confirm to relevant BIS while operating handles.
26. All appliances/accessories/items in the electrical use must be as per relevant BIS if applicable in order to prevent any leakage current and failures leading to electrical accidents. Substation to be provided with stones chips of requisite size and up to sufficient depth level to provide electrical resistance to staff working in switching area.
27. All armored cables are to be connected to separate earthing and connected with it rigidly by GI wire/MS flat with sufficient cross-section.
28. Appliances/Accessories are not to be connected with loose wire but proper wiring is to be done following standard procedure. All appliances/accessories are to be connected with 3 wire plug/5 wire plug sockets in which one is earth wire connecting to the body of appliances/accessories. Earth wire of wiring should have continuity and to be connected to earthing rigidly.
29. All water coolers, Geysers, Heaters, ticket vending machines, operating switch cubicles and protection metallic mesh to be connected with separate earthing with GI wire or MS flat of suitable cross-section rigidly.

30. Competency certificate to be given by Sr.DEE to all staff working on electrical equipment, electrical assets as per voltage level and periodically renewed as prescribed.
31. Public address system equipment's body to be connected to earthing and if with flexible connection from nearest switchboard then with 3 pins top socket arrangement in which earth wire gets connected to the body of the system equipment. In no case 2 wire plug top socket to be used.
32. All Geysers, water heaters and steamers / steam generator are to be connected to water pipelines with flexible PVC pipes, such that there will not be any conducting connection with their bodies.
33. Rubber mats of suitable thickness as per BIS specification only to be provided along with control panel so that staff can stand on them and work.
34. While working on overhead electrical lines it must be ensured that the work section is connected with earthing by discharged rod from both sides of the work section.
35. The Quarters/offices/station distribution board to be provided with RCCB of suitable rating so as to detect any leakage of the current from the closed circuit and ensure timely disconnection of such circuits.
36. Selection of proper size of the OCPD is the key for ensuring their timely operation in case of short circuit and earth fault. Proper rated MCBs/MCCBs are to be provided, the current rating of the MCB connected to a circuit should be at par or one higher to the connected load.
37. Raising of cable through GI pipe shall be carefully done, by ensuring that no mechanical damage is caused to the cable by the raising pipe. It is to be ensured that there are no sharp edges in the raising pipe which damages the insulation of the cable. Bitumen shall be provided in both top and bottom of the raising pipe. The cable through the raising pipe should be free from any kind of mechanical stress. Insulating sleeves or any similar material shall be provided to prevent cable damage due to raising pipe.
38. Cable termination and dressing should have high quality standard and workmanship and it should be ensured that electrical safety is not compromised in any aspect.
39. The insulation resistance shall be measured between live conductors and the earthing conductor connected to the earthing arrangement.

Circuit voltage	Test Voltage	IR M ohm
Safety extra-low voltage	250	$\geq 0.5$
Up to and including 500V	500	$\geq 1.0$
Above 500V	1000	$\geq 1.0$

40. All electrical control panels, DG sets, Substations equipment, ATVM's, Water coolers, High Mast lights, Metallic poles carrying electrical lights/wires, LC booms, Motor/DG sets in the public area, etc. to be rigidly connected to their independent earthing with suitable metallic earth wire/earth flats of prescribed material and requisite cross-section to handle fault current.
41. The cross-section of earth wire/earth flat to be such that it will not break/melt/give up while being subjected to maximum fault current otherwise, in such a situation the protected installation/equipment will become floating and fatal to humans & animals. Even it may lead to an electrical fire. This should be taken care of.
42. All equipment/installations to be protected against leakage current by suitable capacity RCCB
43. The earthing value is to be measured in prescribed periodicity in the dry season and to be kept within limits. Even if needed more earthing can be provided in parallel connection mode to keep earthing value well within limits. The measured data and measured value to be recorded in the register as well as on the earth pit chamber.
44. While deciding/designing /erecting earthing it should be ensured that it should be as below as possible w.r.t earthing value limit prescribed

## **B. TECHNICAL SPECIFICATIONS**

All items shall be provided as per technical specification and drawings given below. Items in the schedule given in the NIT shall be read in conjunction with technical specifications/ explanatory notes given below.

### **1. SPECIFICATION FOR SUPPLY/LAYING OF HDPE PIPE**

The HDPE pipe material should be confirming to standard IS 4984-1995 or latest and should be of PE-80 material designation which has MRS(Minimum Required Strength) of 8.0MPa and maximum allowable hydrostatic design stress of 6.3 MPa (@20 °C)with pressure rating of PN-6(6kg/cm<sup>2</sup>),heavy gauge has to be provided.

The cable has to be laid through HDPE pipe with all necessary accessories for jointing, clamping, bends etc. as per site condition has to be provided.

### **2. SPECIFICATION FOR TRENCH FOR LTUG/HTUG CABLES TRENCH AND LAYING EXCAVATION OF CABLE TRENCH**

Excavation of cable trench 450 mm wide and 1000 mm deep in all kinds of soil and refilling the cable trench with excavated soil free from unwanted materials, ramming, consolidating and bringing the surface to its original finish.

b) Cable route indicators have to be provided along the route of LTUG/HTUG cable in ground at both the ends of the length and at all deviation points. Cable route indicators have to be provided along the route of cables in ground at both the ends of the length and at all deviation points. Cable route indicators shall be with cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size ) of size 60 cm X 60 cm at the bottom and 50 cm X 50 cm at the top with a thickness of 10 cm including inscription duly engraved as required)

c) Trench for cable underneath the track/road:-

Cables shall be drawn through HDPE pipes. Trench to accommodate pipe shall be of suitable width and excavated at 1.0 m below the formation level. Once the pipes are laid in the trench, it should be made to its original formation level by filling it up with excavated earth by watering and ramming process and resetting the ballast of track to its original level. Similarly wherever road has been dug for laying the cable the same should be filled, rammed and asphalted and brought to original condition.

The cable rising above ground shall be taken through GI pipe neatly clamped and open end of GI pipe has to be sealed with bitumen compound. The cable has to be laid along the route as per instruction of Engineer-in-charge.

### **Specification For Laying Of LTUG Cables**

The laying of LTUG Cable includes un-coiling of cable from cable drum, Laying the cable in the trench free from twists, bends, Peeling of Insulation, Dressing at Terminal Ends, Provision of Cable glands, Crimping with suitable shoe, Connection at both ends & Earthing of Armour at both ends.

### **3. SPECIFICATION FOR LED LIGHT FITTINGS**

All indoor/Outdoor LED fitting shall be conforming to CEE/SWR specification No SWR/LED LIGHT FITTING (Indoor/Outdoor)/001-2016 (attached below) compliant to the Schedule uploaded in IREPS.

Prior to the supply of light fittings approval is to be taken duly submitting sample light fittings to the concerned SSE in-charge.

### **4. SPECIFICATION FOR SINGLE CORE / Multi Core PVC or FRLS-PVC INSULATED (as per schedule) FLEXIBLE COPPER CONDUCTOR CABLES**

Single/Multi Core, PVC or FRLS-PVC insulated, (as per schedule) multi stranded flexible copper cable conforming to IS: 694-2010 or its latest editions with bright annealed based copper conductor as per IS: 8130 of 2013 or its latest editions, with ISI marked.

## 5. GENERAL GUIDELINES FOR PVC CONDUIT WIRING

- a) Drilling holes in the walls should be done very carefully without causing damage to supporting wall and structure of building. Minor damages caused if any to the plastering on the wall should be repaired by the contractor.
- b) Wall crossings should be through PVC pipe of 25/20 mm dia (2 mm wall thickness).
- c) Looping of neutral is not permitted; a separate neutral wire is to be drawn from the neutral strip connector in Sub circuit board to each point.
- d) The wiring shall conform to latest IS specification (IS-732) and NEC Code for internal wiring in buildings. No joint is permitted in wiring.
- e) The pipes should be fixed on to the walls in exactly horizontal or vertical fashion as required as per site condition and there should not be gap left between the consecutive lengths. The pipes should be fairly tight to facilitate easy removal and replacement of the same for maintenance wherever required.
- f) The Junction Boxes, straight through joints, bends etc should be provided where ever necessary.
- g) The wires taken inside the pipe shall not be cramped and wires should be easy to pull out at the time of maintenance/checking.
- h) Number of wires that can be drawn through a PVC conduit/ casing and capping shall be as per CPWD specifications Part I Internal 2013 or latest (Table I of Chapter 4).

## **PROVISION OF CABLE TAGS/IDENTIFIERS WHILE ELECTRIFICATION/WIRING WORKS**

- a) Every cable/Electrical wire 6 sq. mm or above is to be provided with cable Tags/identifications.
- b) The cable Tags/identification at the end connection is to be provided so that they are identified easily behind the lug/terminals.
- c) At the beginning and end of cable / exposed portion (BIS: 12949:1990), the cable Tagging/identification will be provided at 3 per 10 metres. The remaining portion cable marker is to be provided at 10-meter intervals.
- d) Cable Tags /identification can be PVC ferrule type, printed PVC sticker type protected by transparent self-adhesive tapes, or legibly handwritten paper protected by transparent self-adhesive tapes etc.
- e) The cable numbering/coding is to be indicated in the wiring diagram/cable route diagram and the same number code is to be printed on the cable Tags/identifications.
- f) Wiring Diagram/cable route diagrams are an essential part and are to be approved by Sr.DEE/G before commencement of work.
- g) Cable Tags / Identifiers are different than Cable Route Marker/Indicator. These markers are provided while laying/drawing cable on cable body itself.

## 6. SPECIFICATION FOR BLDC FANS

BLDC fan as per schedule and following specifications to be provided. This includes supply and provision of Fan Hook/Brackets, if the same is not provided by engineering branch.

Description: Energy Efficient Brush Less DC Motor (BLDC) Ceiling Fan		
Technical Specifications:		
1.	Sweep	1200 mm
2.	BEE rating	5 star
3.	Rated power	28 Watts Maximum, tolerance as per IS 302 Part 1 or latest
4.	Operating Voltage	140-290V single phase AC
5.	Frequency	48-52 Hz
6.	Air Delivery	210 M <sup>3</sup> /min
7.	Harmonic Distortion	5% Max



8.	Speed Control	Speed control regulator and IR remote
9.	Blade thickness	1.1 mm
10.	Blade material	Aluminium
11.	Bearing	Double Ball Bearing
12.	Down Rod Size (without Shackles)	300 mm
13.	Shank & Shackle Thickness	2 mm (Minimum)
14.	Canopy	2 Nos
15.	Color	Standard white
16.	Warranty	5 Years
17.	IS Specifications	Conforming to (a) IS 616/2010 or latest for safety requirement for electronic equipment. (b) Performance test for air delivery as per IS 374/2019 or latest. (c) IS 374/2019 or latest.
18.	Test Report	The firm has to submit type test report from Government accredited test labs like NABL/CPRI etc.

## 7. SPECIFICATION FOR GI PIPE EARTHING

Earthing should be as per IS 3043 :1987 with latest amendments and correction slips.

Earthing shall be with “ C “ class GI pipe with nominal bore of 50mm, wall thickness of 4.5mm and mass of 6.19 Kg. / Mt with tolerance of — 10% in thickness and +1- 10% for weight confirming to IS 1239 Part I /2004 with latest amendments. The earthing arrangements shall be provided as per the enclosed drawing given below with the following.

- GI wire of size 6/8 SWG or GI strip as per schedule for LT earthing
- Earth wires shall be protected against mechanical damage and Earths shall be interconnected wherever required.
- There should not be any joint for extension of connection from earth electrode to equipment
- The earthing schedule includes supply of all materials, digging of pits and providing with cement. The earth plinth shall be painted with black paint all round. All civil works in this connection shall be done by the contractor.
- Individual earthing shall be tested with Earth resistance tester in presence of Engineer in Charge and the Earth resistance values with date of testing done and due date for next testing should be painted on the respective earth pit.
- The earth pit can be constructed either by brick masonry having 80 mm or with RCC having 50mm wall thickness.

## 8. SPECIFICATION FOR SUPPLY / ERECTION OF TUBULAR LAMP POST

Design, Supply and erection of Class C 100 mm dia (Nominal Bore -NB) tubular lamp post 6 mtr long with silver powder finish with CC foundation with supply and provision of loop in loop out box and 50mm dia (NB) Class B GI pipe 2.5 mtrs for taking leading in and out cable including all accessories. The loop in loop out box and copper cables for extension of power supply to light fittings should be as per specification below only. Provision of GI strips with nut bolt arrangements should be made on the pole for fixing of loop in loop out box. The base plate for the tubular post should be of size 300x300x6 mm. Copping of 300x300x300 mm shall be provided. The pole shall be fixed in a pit of size as per the site condition with CC Foundation of M-15 grade of minimum 500 mm x 500 mm x 1000 mm (LxWxH) or as required as per site condition. The cross arm shall be of 25 mm dia Class C GI pipe supported by 25x6mm GI flat. Tubular lamp post to be provided as per the Detailed Drawing attached.

## **9. SPECIFICATION FOR LOOP IN LOOP OUT BOX OUTDOOR TYPE FOR TUBULAR LAMP POSTS**

BOX: Made from SMC(Sheet Moulding compound)/polycarbonate ideal for outdoor application. Inclined roof for water run out. Single door with proper hinges, side opening and Ball Catch locking system and shall be provided facing countryside.

Cable Entry: This is through 3 Holes with grommets at equal distances provided below the box. Provision should be made for Light fittings wires to run through the channel behind the box. Box size( Minimum) Wall Thickness of box = 3mm.

Accessories : (1) SP MCB 6A-1 No, (2) 32 Amps 4 way terminal block-1No, (3) 16 Amps neutral Link All Mounted on SMC(Sheet Moulding compound)/polycarbonate base of thickness not less than 4mm of FR Grade.

Properties of Box Material: SMC(Sheet Moulding compound)/polycarbonate –Non rusting/non corrosive –Shockproof/ non reactive to weather changes. –Non-sparking, /Resistant to propagation of fire.

## **10. SPECIFICATION FOR MOULDED CASE CIRCUIT BREAKERS (MCCB)**

MCCBs shall conform to IEC 60947-2: 2016+AMD 1:2019 or latest (Ics = 100% Icu) and shall have ON, OFF & TRIP indications with breaking capacity as specified in the relevant Schedule item. MCCBs shall be suitable for three phase, 415 Volt, AC supply.

Necessary spreader terminals are to be provided as per requirement.

### **11. SPECIFICATIONS FOR MCB s:**

MCB s shall conform to IEC/IS 60898 / 60947 with latest amendments and correction slips.

### **12. SPECIFICATIONS FOR RCBO s:**

RCBO s shall conform to IEC-61009-1:2010 or latest or IS 12640-2 (2008) with latest amendments and correction slips.

### **13. SPECIFICATIONS FOR RCCB s:**

RCCB s shall conform to IEC-61008 or IS 12640 with latest amendments and correction slips.

### **14. SPECIFICATIONS FOR DBs**

All kind of DB s shall conform to the applicable provisions as per IEC 61439 or IS 13032 or IS 8623 or latest.

### **15. SPECIFICATIONS FOR PLUGS AND SOCKETS:**

Plugs and Sockets shall be ISI marked and as per IS 1293:2019 with latest amendments and correction slips.

### **16. SPECIFICATIONS FOR SWITCHES:**

Switches shall be ISI marked and as per IS 3854 (1997) reaffirmed 2002 with latest amendments and correction slips.

### **17. SPECIFICATIONS FOR EXHAUST FANS/ WALL MOUNTING FANS:**

Exhaust Fans/ Wall Mounting Fans shall be as per IS 2312 with latest amendments and correction slips.

### **18. SPECIFICATION FOR CENTRALISED METER PANEL WITH METERS**

Centralised metering panels shall be provided as per schedule, including supply and provision of meters . The digital KWH meters shall conform to IS 13779 with latest amendments and correction slips.

### **19. BUS BARS FOR METER CUBICLE**

The bus bars shall be made of high conductivity Copper conforming to the requirement of IS 1897/1983 for copper. The bus bars shall have uniform cross section. (Basis of bus bar cross section will be maximum of 1000 A/sq. inch for copper).

The cross section of the neutral bus bar shall be same as that of the phase bus bar for bus bars of capacity up to 200 Amp. For higher capacities, the neutral bus bar shall not be less than half (50 %) the cross-section of that of the phase bus bars. Bus bars shall be supported on suitable non-hygroscopic, non-combustible, material such as DMC/SMC.

The joints in the bus bars shall be provided with fish plates on either side of the bus bars to provide adequate contact area. Bus supports shall be provided on either side of the joints. All bus bars shall be insulated with PVC tapes/tubes (heat shrink type) with colour coding (Red/Yellow/Blue/Black) to withstand the test voltage of 2.5 kV for one minute.

### **20. BUS BARS FOR BUSBAR BOXES**

The bus bars shall be made of high conductivity Copper conforming to the requirement of IS 1897/1983 for copper. The bus bars shall have uniform cross section. (Basis of bus bar cross section will be maximum of 1000 A/sq. inch for copper).

The cross section of the neutral bus bar shall be same as that of the phase bus bar for bus bars of capacity up to 200 Amp. For higher capacities, the neutral bus bar shall not be less than half (50 %) the cross-section of that of the phase bus bars. Bus bars shall be supported on suitable non-hygroscopic, non-combustible, material such as DMC/SMC.

The joints in the bus bars shall be provided with fish plates on either side of the bus bars to provide adequate contact area. Bus supports shall be provided on either side of the joints. All bus bars shall be insulated with PVC tapes/tubes (heat shrink type) with colour coding (Red/Yellow/Blue/Black) to withstand the test voltage of 2.5 kV for one minute.

### **21. SPECIFICATION FOR MOULDED CASE CIRCUIT BREAKERS (MCCB)**

MCCBs shall conform to IEC 60947-2: 2016+AMD 1:2019 or latest (Ics = 100% Icu) and shall have ON, OFF & TRIP indications with breaking capacity as specified in the relevant Schedule item. MCCBs shall be suitable for three phase, 415 Volt, AC supply.

Necessary spreader terminals are to be provided as per requirement.

### **22. SPECIFICATION FOR FEEDER PILLAR PANEL/ LT panel**

Outdoor LT panel/ Feeder Pillar Panel Box made out of sheet steel, vermin and dust proof with Siemens gray powder coated paint duly following 7 tank process for powder coating, floor mounting type, with lock and key arrangements. Necessary certifications for carrying out the 7 tank process by the manufacturer shall be submitted. The panel shall be mounted on channel frame of size 100mm x 40 mm fixed on rack bolts including casting of suitable foundation with cement concrete - M15 grade.

Two column foundation with necessary spaced cable duct in between, to be provided. The width of each column shall be minimum 200 mm. Length of each column shall be 200 mm more than the length of the panel. The depth of foundation shall be minimum 700 mm from the ground level. The plinth should be at a height of 400 mm from ground level for floor mounting.

The panel shall be provided with copper bus bars of capacity as mentioned in against item, heavy duty selector switches, indication lamps etc. Voltage system and Metal Danger boards for panel and Metal indication plates for switchgears are to be riveted. Arrangements for provision of two

separate and distinct earths to be made in the panel, with interconnections as required.

The main incoming cable entry should be from bottom of the panel. Bus bar chambers and cable entry chambers should be separate.

The Panel board shall be accommodative of Cable Alley and Bus Bar Chamber. Drawing showing the details of panel should be submitted to this office and necessary approval should be obtained before fabrication / supply of the item.

**a) BUS BARS (for Feeder Pillar panels/ LT panels)**

The bus bars shall be made of high conductivity Copper conforming to the requirement of IS1897/1983 for copper. The bus bars shall have uniform cross section. (Basis of bus bar cross section will be maximum of 1000 A/sq. inch for copper). The cross-section of the neutral bus bar shall be same as that of the phase bus bar for bus bars of capacity up to 200 Amp. For higher capacities, the neutral bus bar shall not be less than half (50 %) the cross-section of that of the phase bus bars.

**Earth Bus bar:** 02 Nos. of 20 x 3 mm copper strip for LT panels up to 400A capacity and 02 Nos. of 20 x 5 mm copper strip for LT panels of higher capacity shall be provided.

Bus bars shall be supported on suitable non-hygroscopic, non-combustible, material such as DMC/SMC. The joints in the bus bars shall be provided with fish plates on either side of the bus bars to provide adequate contact area. Bus supports shall be provided on either side of the joints. All bus bars shall be insulated with PVC tapes/tubes (heat shrink type) with colour coding (Red/Yellow/Blue/Black) to withstand the test voltage of 2.5 kV for one minute.

**b) Multi data meter**

Multi data meter with RS 485 and the following parameters to be provided.

- True RMS measurement.
- High / low recording VLL, VLN, A, Hz, W, VA, PF, VAr value storage with time stamp.
- Accuracy class 1.0 as per IEC 62053-21.

**23. SPECIFICATION FOR STORAGE TYPE GEYSER**

This work includes Supply and installation of storage type water Geyser of 15 litres/ 25 litres ,a s per schedule, capacity, BEE 5 star rated with ABS body, stainless steel tank , pressure safety relief valve, as per IS 2082:2018 latest , 2 meter cable with 3 pin plug 16A with all necessary accessories for fixing.

**24. SPECIFICATION FOR TRENCHLESS / HORIZONTAL DIRECT DRILLING (HDD)**

Drilling in ground, below and across to track/road by trenchless technology for uncoiling, stretching and laying of HTUG/LTUG cable including supply and placing of suitable encasing HDPE pipe (as per schedule) with all necessary accessories to be provided. This includes supply of HDPE pipe. The HDPE pipe supplied should be as per specification defined above only. Drilling shall have a minimum of 1000 mm depth in all kinds of soil.

**25. SPECIFICATION FOR LIFTING AND LOWERING, COMMISSIONING OF NEW PUMPS.**

The contractor has to arrange at his own cost necessary means for lowering submersible pumpset with pipes from the bore wells/GLR/openwells using contractor's own tools and tackles in the existing bore well/GLR/openwells duly coupling the pipes which are lifted from the bore well/GLR/openwells including proper maintenance duly deploying sufficiently skilled labourers, Jigs, Tools & Machinery for the above works. This work includes stretching and laying of new HDPE pipe as required.

## **26. SPECIFICATIONS FOR PUMP SETS & STARTER/ CONTROL PANEL**

### **SPECIFICATION FOR SUBMERSIBLE PUMP SET**

All the pumpsets shall be electrically driven, continuously rated and shall be suitable for duties and heads mentioned in the schedule when pumping clear cold water at approximate temperature of 33 degree Celsius. All the pumpsets shall be with submersible motor, totally enclosed and directly coupled to pump. The pumpset shall be of complete unit with all accessories for pumping of water.

Open well submersible pump sets shall conform to IS 14220 with latest amendments or equivalent ISO specifications.

Submersible Pumpsets for borewell shall conform to IS 8034/2002 with latest amendments.

The motor for the pump sets shall conform to IS 9283/2013 with latest amendments. Insulation class of motor : Class F

The pump impeller shall be of High tensile brass (as per IS 304)/ leaded tin bronze (LTB 2 of IS 318)/stainless steel and shaft shall be of wrought/Chromium steel/Stainless Steel, winding conductor of electro grade copper with PVC/Polymer insulation. All other materials of the pumpset shall be as specified in IS specification. The casing for open well submersible pump sets shall be of Cast Iron (FG-200).

The successful tenderer has to submit the type/routine test certificates for the pump.

The mono submersible pumpset shall be suitable for horizontal mounting and the same has to be erected inside the GLR with suitable base frame and clamping arrangements. After erection at site, the pumpset has to be tested and commissioned including measuring for discharge of pumpset & current taken by motor.

### **SPECIFICATION FOR PUMP STARTER/ CONTROL PANEL**

This work includes supply, erection, testing and commissioning of the pump starter/ control panel. The pump starter/ control panel enclosures shall be made of 18 SWG sheet steel with locking arrangements and with suitable clamping arrangements. The DOL starter/ and contactors, relays, MCB, voltmeters and ammeters with single phase preventer, over load relay and U/V trip shall be mounted inside.

The control panels shall consist of TPN MCB & 4P Contactors. Pump guard consisting of single phasing cum dry run protector, Voltmeter – 0-500V, Ammeter and duly wired with appropriate size PVC insulated multi strand copper conductor / strips.

Phase Indicator lamp shall be provided on the front door of the control panel enclosure. The enclosure shall be of suitable size for easy usage and undertaking repairs.

The whole enclosure unit shall be mounted with GI bolts, nuts and washers on the wall / posts with at least 2 clamps or on ground with suitable masonry plinth. All the control panels has to be connected to earth with 02 Nos. GI wire.

### **A. List of Drawings–**

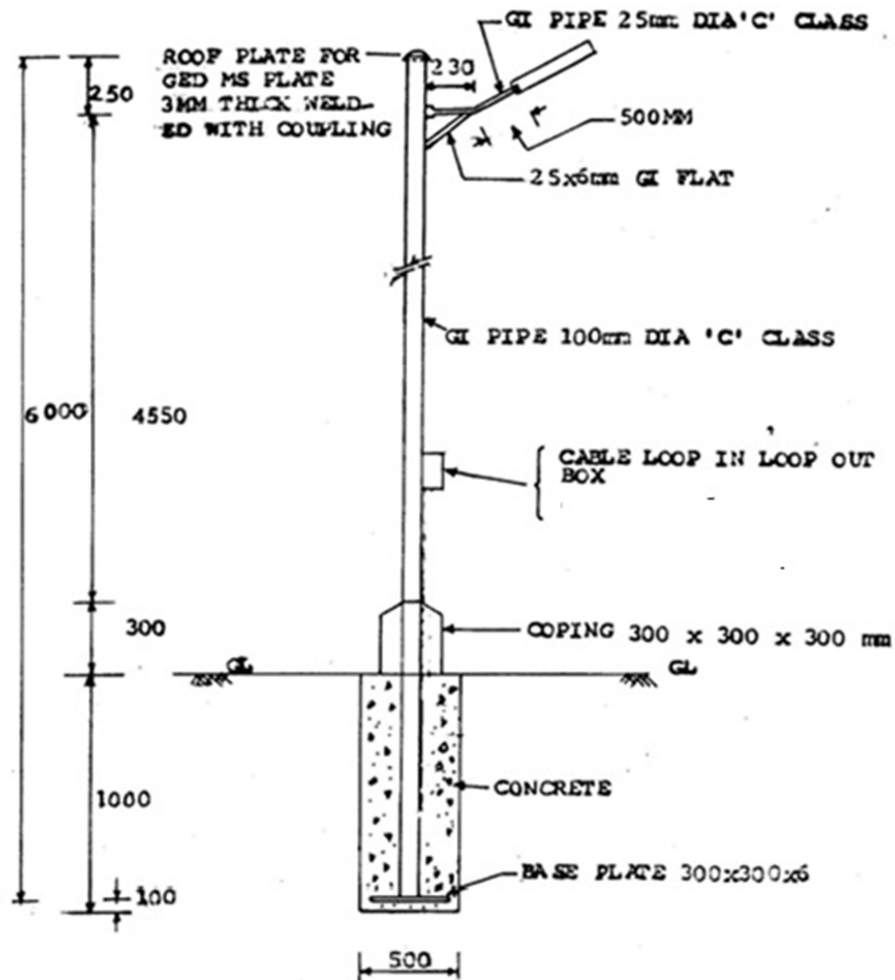
Drawings attached herewith forms a part of technical specifications mentioned in this tender

document. Execution of work should be as per technical specification and drawings attached.

	Description
a	GI pipe earth
b	Tubular Lamp post



### Drawing for Tubular lamp post





- a) **List of Materials /Approved Brands:**The make of materials shall be any one of the following makes. Materials as required as per the tender schedule shall be provided.

Sl. No.	Description	Makes
1	ACB, MCB, MCCB, COS, DBs with MCB /MCCB incomers, MCB/ MCCB enclosures, RCBO, RCCB, Earth Fault Relay, Timers, Contactors	Legrand, L&T, ABB, Siemens, Schneider
2	HDPE Pipe	Jindal Pex, Supreme, Finolex , Mangalam , Dutron, Apollo
3	Measuring/ Metering Instruments/ Multi data Meter etc	Schneider, ABB, L&T, Elmeasure, HPL, MECO
4	Junction Box , Enclosure ,LILLO box, Meter Box , busbar box etc.	Schneider, Sintex, Hensel, ABB, CAPE Electric, Legrand, L&T, Havells
5	Class B/C GI Pipe	Jindal, Tata, APL Apollo, Swastik, Zenith
6	Copper wire	SBEE, Finolex , Havells, Gloster, Polycab ,KEI, V-Guard, Anchor
7	Modular Switches, Key tag switch, Switch box, Covering plate, Sockets, Holders, MCB protected sockets	Anchor Roma, Havells, Crabtree, Legrand, GM, C&S, ABB, L&T
8	PVC/CPVC Conduit/ casing and capping	APL Apollo, Astral Pipes, Anchor, Ashirvad, Supreme ,Skipper Ltd, Finolex, Dutron , Prince, Sun, GM
9	Cable Termination Kits, Jointing kits/ Lightning Arrestor	Any BESCO approved makes
10	BLDC Fan/ Exhaust fan/ wall mounting fan/ Pedestal fan/ Industrial Air circulator	Usha, Atomberg, Orient, Crompton, Havells, Panasonic, Bajaj, Khaitan, Almonard
11	UPS/ Inverter	Hykon, Numeric, Microtek, APC Schneider , Luminous, V-Guard, Emerson
12	Battery	Amaron/ Exide/ Tata Green/ Luminous/ Batteries by the OEM of UPS itself.
13	Light fittings/Lamp	Philips, Bajaj, Crompton Greaves, Havells, Panasonic, Wipro, Jaquar, Surya
14	LED make	NICHIA, OSRAM, SEOUL, PHILIPS LUMILEDS, CREE, LEDNIUM, AVAGO
15	Electric Kettle	V-Guard, Racold, Havells, Supreme, Tata , AO Smith, Crompton, Bajaj, Prestige , Borosil, Milton
16	Solar water heater	V-Guard, Hykon, Racold, Havells, Supreme, Sudarshan Saur, Green Sense, Tata Power
17	Geyser	V-Guard, Racold, Havells, Supreme, Tata , AO Smith, Crompton, Bajaj
18	Room Heaters	Havells , Bajaj, Hindware, Crompton, Usha, V- Guard
19	LTUG/HTUG Cable	SBEE ,Finolex ,Havells, Gloster ,CCI, Polycab, KEI , RPG
20	Industrial Plug & Socket	Anchor , Havells, Legrand, Schneider, ABB, CAPE Electric ,Cyclo Electric.,L&T
21	PIR sensors with switching module	Lutron, Schneider, Siemens, Legrand, Hager

**CEE Specification No SWR/LED LIGHT FITTING (Indoor/Outdoor)/001-2016**

दक्षिण पश्चिम रेलवे

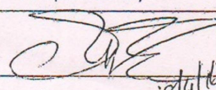
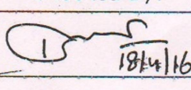
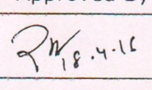
SOUTH WESTERN RAILWAY

## SPECIFICATION FOR LED TYPE (INDOOR/ OUTDOOR) LIGHT FITTINGS

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## 1.General requirements of LED Type (INDOOR/ OUTDOOR) Light Fitting

1	LED Make	NICHIA / OSRAM / SEOUL / PHILIPS LUMILEDS / CREE / LEDNIUM / AVAGO
2	Type of LED	High power, SMD (Surface Mounting Device) LED
3	Lumen Output/Efficiency	> 100 Lumens/Watt
4	Lumen Output at fitting level /Efficiency	> 75 Lumens/Watt
5	LED Life	>50,000 burning hours.
6	Depreciation	30% max. After 50,000 burning hours.
7	Color Rendering Index (CRI)	> 75
8	Nominal Voltage	220 V AC
9	Input Operating Voltage	105-295 V AC
10	Power Factor	> 0.9
11	Protections	
	i. Surge protection	1.5 kV for 50 micro seconds
	ii. Over voltage protection	300 V AC for 2 minutes
	iii. High voltage protection	1.72 Kv AC for 1 minute
	iv. Insulation Resistance	Minimum 2 mega ohms with 500 V megger
12	Driver type	Constant Current driver with short circuit protection
13	Driver components	Industrial grade only
14	THD	< 20%
15	Efficiency of Driver Electronic	Efficiency of driver >85%
16	Construction of Housing	Pressure die cast aluminium or CRCA or Extruded aluminium
17	Finishing	Powder coated / anodised
18	Lamp Cover	Toughened glass of min. 0.8 mm thickness of sufficient strength or high transmittance efficiency (min.90%) Acrylic diffuser as per need of fitting.
19	Secondary optics	Polycarbonate reflector /polycarbonate lence
20	Mounting	Indoor : Suitable for Surface / Recessed /Hung Type Outdoor: Suitable for Existing Pole etc.
21	Ingress protection	IP 20 - Indoor IP 65 - Outdoor

Prepared By:	Checked By:	Approved By:
		
JE/Drg/SWR	DY.CEE/HQ/SWR	Chief Electrical Services Engineer South Western Railway, Hubli



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✓ DEE/SBC

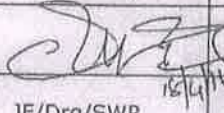
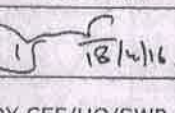
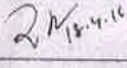
Page 2 of 2	Effective from 18.04.2016	Specification No.: SWR/LED LIGHT FITTING (Indoor /Outdoor) / 001-2016
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2. NOTE


- 1 Supplied LED Luminaires shall confirm to BIS:16107 or IEC:62722 and LEDs to BIS: 16103 or IEC: 62717
- 2 LED Luminaires shall also confirm to LM-79 (For quoted fitting) and LM-80 for LEDs used
- 3 Firms have to submit LM80 & LM 79 test certificate from National/International accredited Laboratory and OEM certificate for compliance of BIS/IEC along with offer.
- 4 Firms have to submit warranty certificate for 5 (five ) years along with supply.


3. Following informations are to be mentioned by consignee in indent description.

- i) Type of luminaire ; Like Street light , Flood light, Focus light, Retrofit (for retrofit type luminaire, this specification may be referred wherever applicable )
- ii) Total wattage of LED luminaire
- iii) Arrangement of LED :Single LED / Multi LED
- iv) Dimentions if required.
- v) Indoor / Outdoor
- vi) Mounting type : i.e. Indoor : Suitable for Surface / Recessed /Hung Type  
Outdoor : Suitable for Existing Pole etc.

Prepared By:	Checked By:	Approved By:
		
JE/Drg/SWR	DY.CEE/HQ/SWR	Chief Electrical Services Engineer South Western Railway, Hubli

This Specification supersede earlier General specification for LED Luminaires No.SWR/Spec/LED Dt.12.06.2015

  
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Sr.DEE/G/SBC

  
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